

MINUTES OF CLOUD-NET THIRD PROGRESS MEETING

24-25 April 2003, Dept of Meteorology. U of Reading, UK.

Present: Jacques Pelon, Martial Haeffelin, Dominique Bouniol (IPSL), Jean-Pierre Claeysman (24th only) (Degreane); David Donovan (KNMI); Adrain Tomkins (24th only) ECMWF, John Goddard, Charles Wrench, Jon Eastment (24 only), Judith Agnew (pm 24th, and 25th) (RCRU); Herman Russchenberg, (TUD); Pekka Ravila (Vaisala); Robin Hogan, Malcolm Brooks, Anthony Illingworth (co-ordinator.), Nicolas Gaussiat (Administrator), Ewan O'Connor, Andrew Openshaw (UR).

1. GENERAL REMARKS and PROGRESS ON DELIVERABLES.

1.1 Apologies for absence. Jean Marcel Piriou (Meteo-France) has been ill and Damian Wilson (Met Office) had been unexpectedly ordered to attend a meeting in Exeter.

1.2 Actions arising. All dealt with under other headings apart from:

Old Action 2.2 – MH to provide document on accuracy of SIRTA radiometer LWP.

Still pending.

Old Action 3.2 – AJI to respond to DWD (Gerhard Adrian) to welcome their model data.

ACTION 1.1 - AJI to write to Gerhard Adrian to remind him.

2.2 Requirements for Second Annual Report.

AJI outlined the requirements for the annual report, the draft technology implementation plan and the need to identify breakthroughs/milestones.

1.4 Web –site. All the presentations given at this meeting are to be found on the web site under 'talks' in the order in which they are listed in the agenda.

3 Review of progress on archiving observations and model data.

2.1 Review of Model Data Archiving.

Robin Hogan lead the discussion and described the NetCDF data and quicklooks currently on the web available for the models of ECMWF, Met Office and Meteo-France.

This is available at: http://www.met.rdg.ac.uk/radar/data/dat_format.model_netcdf.html

The situation with the RACMO/HIRLAM data at KNMI is unclear. HIRLAM data is only available every three hours for one cloud variable, RACMO every hour.

ACTION 2.1 DD to liaise with RJH and decide how this model data is to be converted to NetCDF and archived – ideally both models would be archived.

It was agreed that the Met Office global model data – being archived under another project would be useful to cloudnet to check sensitivity to grid box size.

ACTION 2.2 AJI to contact DW about accessing this global data.

2.2 Review of the Archiving of Observational Data at the three sites.

ACTION 2.3 All 3sites (HF, DD RJH, NG). Ensure archiving of broad band radiometers.

Cabauw:

ACTION 2.4: HKB to document his insect removal which is being carried out for the level 1a product – so that RJH can ensure compatibility with the level 1b product.

ACTION 2.5: (HR) TARA 3GHz data to be stored at 30sec resolution in NetCDF so that the files are not too large. This may take several months.

SIRTA

ACTION 2.6. The SIRTA NetCDF level 1b files of radar and lidar should be daily. HF and RJH to liaise over whether it is necessary for the level 1 files to be daily as well, or if the existing hourly files can be used to make the 1b product.

Some disquiet was expressed that the current radar data is only being gathered for twelve hours a day on four days a week, rather than 24 hours a day 7 days a week as is being done at the other two sites, and as required by CloudNET.

ACTION 2.7 AJI to write to Alain Protat about radar data gathering.

2.3 The level 1b product.

Robin Hogan described the level 1b product which cleans up the data for artefacts and provides attenuated lidar data and radar data corrected for attenuation.

In addition the data is categorized and two status bytes which provide information on the category and an indication of the errors associated with such a classification.

ACTION. 2.8 All to comment on the structure of the level 1b product with particular attention to the error estimates.

ACTION 2.9 RJH will try some sample data from the three sites and post on the web.

ACTION 2.10 DD/HKB, MH following action 2.9 to try running the program on data from their own site.

ACTION 2.11 RJH to discuss with DD and GJ of KNMI use of Fortran/C/ Matlab for the Cabauw data. The other two sites are using Matlab which takes about 4 mins per day.

3. OVERVIEW OF INSTRUMENTATION AND DATA GATHERING AT THE SITES.

3.1 Chilbolton. JWFG reported that the 94GHZ radar has been operating continuously (24h/7d) since early April. JWFG presented a comparison of rain gauges which indicated that a tipping bucket (0.2mm) could tip up to 20mins after an optical gauge or J-W disdrometer had detected the onset of light rainfall

ACTION 3.1 JWFG Enquire into price and suitability of the 'capacitive' presence of rain probe. This is needed at Chilbolton and SIRTA to indicate when there may be raindrops on the radome which leads to an approx 10-12dB of 94GHz signal loss.

ACTION 3.2 NG to examine if the use of the falling rain as demonstrated by the Doppler can indicate when raindrops are likely to be present on the radome.

ACTION 3.3 CLW to report when the current difficulties of deriving lwp from the radiometers have been resolved and to quantify the feasibility of using a semi unattended system to derive

lwp to within 100g/m^2 for use in correcting 94GHz attenuation to within 1dB. (see action 3.10).

3.2 SARTA

Operation of the 94GHz radar – see Action 2.7.

ACTION 3.4 AP/DB. Calibration of the 94GHZ. This should be attempted by comparisons with the 5GHZ radar at vertical incidence in cirrus which Raleigh scatters at 94GHZ. The calibration of the 5GHZ radar, which has polarisation diversity, should be carried out using the polarisation redundancy (Z, ZDR and KDP) in heavy rain method of JWFG which should be accurate to 0.5dB.

ACTION 3.5 JWFG/AJI supply DB with details of this ‘auto-calibration’ technique.

ACTION 3.6 If action 3.2 is successful, AP/DB to consider bringing the 94GHz RASTA radar to Chilbolton for cross-calibration in the September/October time frame.

ACTION 3.7 MH. Acquire a tipping bucket rain gauge and arrange for the output to be archived as the previous one is not now to be returned from the USA (see Action 3.4 May 2002, and Action 0.4 October 2002).

ACTION 3.8 MH to liaise with JWFG on the outcome of action 3.1 on the presence of rain sensor.

3.3 Cabauw.

The TARA radar is performing satisfactorily since its repair last November, it has however been out of action since early april following an incident with the UPS, but should be OK again by 1 May.

ACTION 3.9. DD to review cliwanet findings to ascertain if we can expect good LWP from radiometers in cloudnet so that the level 1b can correct for 94GHz attenuation when there are low level liquid clouds. Accuracy of 100g/m^2 is sufficient to correct to 1dB.

ACTION 3.10 CLW to report on ACTION 3.5 in the Chilbolton context.

4. INSTRUMENTATION ISSUES.

The following talks are on the web site:

Micropulse lidar suitability (JP),

The usefulness of multiple field of view (DD).

The IPSL lidar/IR retrieval technique (JP) .

Pulse compression and TARA cloud mask (HR),

Reflectivity and detection threshold of Sc (E O’C) ,

94GHZ calibration at Chilbolton over two years (NG).

It was decided that the IPSL lidar/IR technique was being investigated for space use, but in view of manpower limitations modification for use in cloudnet was low priority.

ACTION 4.1 The LNA has two telescopes with two fields of view. DD to liaise with MH/JP on the interpretation of the backscatter signal from the two fields of view from stratocumulus in terms of drop size, and report at the next meeting.

ACTION 4.2 HR (1 May) finalise document on sidelobes from point targets with TARA

ACTION 4.3 HR to send an existing document comparing cloud echoes at 3/35GHZ and quantifying any sidelobe effects to NG to be posted on the web site.

5. MODEL DEVELOPMENTS.

The following contributions are on the web:

Suggested classification by regimes (submitted by DW).

Developments of the cloud scheme in Meteo France (submitted by J-M P)

Future plans for the cloud scheme ECMWF (AT).

ACTION 5.1 All – to consider the regime types for model output classification and send comments to NG for subsequent circulation.

6. CALIBRATION AND OTHER INSTRUMENT ISSUES.

The following talks are on the web site:

Update on integrated backscatter calibration, and multiple scatter (E O'C)

Calibration of lidars comparing molecular with integrated backscatter (JP)

Comparison of LD40 and LNA lidar returns (MH)

Specular reflection from integrated backscatter (RJH)

ACTION 6.1: E'OC to consider the information available from the output of the background light level of the CT75.

ACTION 6.2: MH to discuss with RJH and HKB how to clear up the LD40 data so that it can be used to indicate low level water cloud for use in producing level 1b product.

ACTION 6.3 DD to report on specular from lidars at different angles during BBC2.

7. ANALYSIS, RETRIEVAL AND MODEL COMPARISONS.

The following talks are on the web site:

Update on iwc and model comparisons and definition of cloud fraction (MB).

Normalised ice particle distributions (Delanoe via DB).

Comparisons of Frisch and BEST approach for Sc (HR)

Comparison of lidar/radar ice retrievals (RJH).

ACTION 7.1: DB to acquire VIPS small sized ice crystal data.

ACTION 7.2 DB to incorporate multiple scattering in the IPSL technique.

8. PREPARATION OF THE SECOND ANNUAL REPORT.

ACTION 8.1 ALL – supply AJI with update to publication list.

ACTION 8.2 AJI to circulate edited list of breakthroughs and milestones produced during the meeting by 29 April for discussion and feedback. A final decision on the topics to be made by 7 May. A paragraph on the topic to be submitted by the appropriate person by 12 May.

ACTION 8.3 WP managers (JWFG, JP, DD) to supply two page summaries of their work packages using the output from action 8.2.

ACTION 8.4 JWFG, HW, JP, DD, to check that cost statements are being prepared in time for the mid-May deadline.

ACTION 8.5: ALL to comment on draft algorithm and technology implementation document tabled by AJI but not discussed.

9. STRATEGY FOR COMMON WORK AND PUBLICATION.

The division of responsibilities for producing the level 2 output from various algorithms was discussed and summarised in the table below. These algorithms should all operate on the level 1b data.

Division of responsibilities for producing level 2 products:

<i>Algorithm</i>	<i>Required input</i>	<i>Optional input</i>	<i>Level 2 output</i>	<i>Comments</i>
Liquid cloud properties				
Frish method (TUD)	Z, LWP	BASE, MODEL?	LWC	Not in drizzle?
Differential attenuation (UR/Gaussiat)	Z35, Z94, MODEL	BASE	LWC	Only Chilbolton
Radar/lidar synergy: drizzle (UR/O'Connor)	Z, BETA	MODEL, WIDTH	LWC_d, D_d, LWF_d	Only below cloud base
Ice cloud properties				
Radar/lidar synergy (KNMI/Donovan)	Z,	MODEL	IWC, extinction, r_e, R'_{eff}	
Radar/lidar synergy (CETP/Tinel)	Z, BETA	MODEL	IWC, extinction, r_e	
Z-T-IWC (UR/Brooks)	Z, MODEL		IWC, extinction	
Dual-wavelength radar (UR/Hogan)	Z35, Z94	BETA?	IWC, D₀	Only Chilbolton
Matrosov method (KNMI ?)	Z, V		IWC, D₀	Used widely by ARM
General cloud properties				
Mask & classification (UR/Brooks?)	Z, BETA, RAIN, MODEL	V, DR, LWP	cloud mask, classification (e.g. phase)	
Turbulence (CETP/Bouniol)	V, MODEL		dissipation rate	V must be high resolution

ACTION 9.1 A working version of level 1b to be available by the end of May 2003.

ACTION 9.2 Two intensive observing periods would be used for the algorithms as a trial, namely the months of May 2003 (to coincide with BBC2 when extra validation data should be available) and June 2003 to coincide with a Met Office experiment at Chilbolton and a cloudmap observing period.

ACTION 9.3 Intensive efforts be made for SIRTA to operate their radar continuously during this period.

ACTION 9.4 All to comment on the specification of the level 2 data posted on the web by RJH. Consideration be given to a simplified cloud-mask style level 2 product.

Following a written submission by DW the following action has been inserted:

ACTION 9.5 ALL: All algorithms used to compare observation and model quantities to be properly documented and the comparisons with different observing sites and different models carried out in an identical fashion.

The division of responsibilities for the comparison of level 2 data with the model data was discussed and the following draft list drawn up:

- a). UR to continue with the comparison of fractional cloud cover, ice and liquid water content and supercooled cloud occurrence.
(note added later – UR would also be comparing particle size and IWC with that derived from the dual wavelength radars at Chilbolton).
- b) IPSL – surface fluxes, and comparison with single column radiation models
- c) KNMI – cirrus and radiation.

ACTION 9.5 AJI to work out an agreement with CLW for an exchange of data between CloudNET and the EU project CLOUDMAP2 (which finishes in Jan 2004).

10 ANY OTHER BUSINESS.

The next meeting should be able to present more results on model comparisons. Efforts should be made to invite relevant people from MeteFrance and Ulrike W? from SMHI.

ACTION 10.1 AJI to invite Gematronik to join Cloudnet and attend the next meeting.

11 Date of next meeting – Second workshop .
20-21 October 2003 starting 9am at MeteoFrance in Toulouse.

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